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GEOGRAPHICAL VARIATIONS IN SHORTIA GALACIFOLIA

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Asa Gray, while at the Jardin des Plantes, Paris, in 1839, found in Andre Michaux's herbarium an unnamed specimen bearing the label, "Hautes montagnes de Carolinie, *An pyrola spec.*? *An genus novum*?" Dr. Gray named the plant *Shortia galacifolia* in honor of his friend and botanical colleague Charles W. Short of Kentucky who sent him many well-prepared trans-Alleghanian specimens.[1] There is evidence to indicate that Michaux found this specimen in 1787 or 1788 at the sources of the Keowee River in South Carolina. On returning to New York, Gray and other plant collectors, mistaking Michaux's label to mean the high mountains northeast of Ashville, sought in vain for *Shortia* in this area. In the spring of 1877, George M. Hyams rediscovered *Shortia* on the banks of the Catawba River in McDowell County, North Carolina, about five miles north of Marion.[2] Nine years later (1886), Charles S. Sargent found it in Oconee County, South Carolina, at the confluence of the Toxaway and Horse Pasture (Green) Rivers.[3] The same year, Frank E. Boynton discovered large quantities of *Shortia* on Bear Camp Creek, a lower tributary of the Horse Pasture River,[4] and three years later (1889) found acres of it in the area about the junction of the Whitewater River and Devil's Fork Creek, and in the lower Jocassee Valley, all in Oconee County.[5] In the spring of 1890, T.

[1] Gray, Asa, Amer. Jour. Sci. & Arts, **42**: 1–49, 1842.
[2] Letter, J. W. Congden to Asa Gray, Oct. 18, 1878 (Gray Herb.).
[3] Sargent, C. S., Amer. Jour. Sci. & Arts, Ser. III, **32**: 466–473, 1886.
[4] Letter, F. E. Boynton to C. S. Sargent, Nov. 7, 1886 (Gray Herb.).
[5] Boynton, F. E., Garden & Forest, **2**: 214–215, 1889.

G. Harbison discovered *Shortia* in great abundance on the Horse Pasture River, between its junction with the Toxaway River and Bear [Camp] Creek.[6]

Recently, Charles F. Jenkins sought for specimens of *Shortia galacifolia* in thirty-one of the leading herbaria in the United States and found ninety-eight sheets. From information on the specimen-sheets he gives the following distributions: "Of these forty-four were collected along the banks of the Whitewater River in Oconee County, S. C. Fourteen more are listed as coming from the Jocassee Valley, also in Oconee County. Thirteen were found in McDowell County, N. C. more definite locations not being given. Eight were found in the Toxaway Gorge in Transylvania County, N. C., three along Bear Camp Creek and two along the Horse Pasture River, both locations in Transylvania County. One each from "the mountains of N. W. Carolina," "4 miles N. W. Salem, S. C." and "Macon Co., N. C." The remainder are specimens with labels giving no definite locality or coming from cultivated plants."[7] Through the kindness of William C. Coker, University of North Carolina, a map was received showing all the locations of *Shortia galacifolia* known to him.[8] On his map were shown stations of *Shortia* not indicated in Jenkin's report. Numerous stations were located on the sources of the Little River in Oconee County; several stations on the right bank of the Keowee, above the entrance of Eastatoe Creek, also in Oconee County; and two stations on the left bank of the Keowee, below the entrance of Eastatoe Creek in Pickens County. The latter is a new county record. H. J. Oosting, of Duke University, collected *Shortia* in the Toxaway Gorge in Transylvania County, North Carolina.[9] The Rev. A. Rufus Morgan, Franklin, North Carolina, found it on the Toxaway River above the North Carolina border and on the Whitewater River just above its junction with the Thompson River.[10]

Wilbur H. Duncan, Haskell Venard, and G. W. McDowell discovered in March, 1949, a colony of *Shortia* (eight by four

[6] Clute, W. N., Amer. Bot., **32:** 65–68, 1926.

[7] Jenkins, C. F., Arnoldia, **2:** 13–28, 1942.

[8] Map, W. C. Coker, Botany Dept. Uni. North Carolina, copy sent to P. A. Davies, May, 18, 1948.

[9] Specimen in Gray Herb. collected July 15, 1936.

[10] Map, A. Rufus Morgan to P. A. Davies, Aug. 8, 1951.

feet) near Reed Creek in Rabun County, Georgia, and in August of the same year the senior author found a small colony near the original one.[11] The writer examined a specimen sent to the Gray Herbarium by Duncan, Venard, and McDowell from Rabun County, Georgia and found it to have the same characteristics as plants collected from the sources of the Keowee River.

The range of *Shortia* on the tributaries of the Catawba River in McDowell County, North Carolina, is rather small. A few colonies are present on Lackey Branch, a small tributary of Tom's Creek. Numerous colonies can be found on the Fish Hatchery Creek (John's Creek) above the hatchery. On the upper part of the creek (no name) and its branches which run beside the road leading to the Joe McNeely farm, *Shortia* is rather abundant. F. M. Crayton has found *Shortia* on the Linville River west of Table Rock in Burke County, North Carolina.[12]

Distribution data show that *Shortia* is confined to two general areas. One comprising Oconee and Pickens Counties, South Carolina; Transylvania and Macon Counties, North Carolina; and Rabun County, Georgia. The other area, across about 60 miles of mountainous terrain is in McDowell and Burke Counties, North Carolina.

On March 22, 1951, the author had the opportunity of gathering *Shortia galacifolia* in flower on the Whitewater and Horse Pasture Rivers, tributaries of the Keowee River in Oconee County, South Carolina. The next day, March 23, he collected plants in flower on Fish Hatchery Creek (John's Creek) and on the creek running beside the road leading to the Joe McNeely farm, both tributaries of the Catawba River in McDowell County, North Carolina.

In the latter part of May, 1951, the writer collected specimens of *Shortia* in fruit on the Horse Pasture River; Bear Camp Creek; Toxaway River, both above and below its junction with the Horse Pasture River; at the confluence of the Toxaway and Whitewater Rivers; along the Whitewater below its junction with the Thompson River and about one half mile along the lower part of the Thompson River, all in Oconee County, South Carolina. Also two collections were made on the upper part of

[11] Duncan, W. H., Haskell Venard and G. W. McDowell, RHODORA, **52**: 229–232, 1950.

[12] Letter, F. M. Crayton to P. A. Davies, June 22, 1951.

Bear Camp Creek in Transylvania County, North Carolina. On June 1, 1951, specimens in fruit were gathered on Lackey Creek, a small tributary of Tom's Creek; on John's Creek above the Fish Hatchery and on the creek which runs beside the road leading to Joe McNeely's farm, all in McDowell County, North Carolina.

Distinct floral variations are exhibited by *Shortia* from these two areas.

Keowee River	Catawba River
Petals 16.20–19.20 mm. long	Petals 14.0–16.5 mm. long
Apical petallary notches 7–13; 0.10–2.58 mm. deep	Apical petallary notches 14–21; 0.10–1.42 mm. deep
Veins of petals few	Veins of petals numerous
Staminodial hairs 0.24–0.25 mm. long	Staminodial hairs 0.10–0.11 mm. long
Styles 14.6–16.0 mm. long, slender	Styles 9.6–10.27 mm. long, stout

Michaux's type specimen lacked petals, stamens and staminodia. Drawings of this specimen, including a separate complete pistil, made by M. Joseph Decaisne in 1839 is in the Gray Herbarium. In order to determine the source of Michaux's specimen, an index was developed between the average length of mature ovaries and that of the styles. For specimens from the sources of the Keowee River the index was 1:2.37 and from the Catawba River was 1:1.28. Using the index, it shows that Michaux's specimen came from the sources of the Keowee.

Considering plants of *Shortia galacifolia* Torr. & Gray from the sources of the Keowee River as typical of the species as originally described, and plants from the sources of the Catawba River as variants from this type, the author is establishing a new variety for the plants from the sources of the Catawba River.

Shortia galacifolia Torr. & Gray var. **brevistyla,** var. nov., petalis 14.0–16.5 mm. longis, apice 14–21-serratis, sinubus 0.10–1.42 mm. altis; venis petalorum numerosis; staminodiis hirsutis pilis 0.10–0.11 mm. longis; stylo 9.6–10.27 mm. longo, crasso.

The type of *Shortia galacifolia* Torr. & Gray var. *brevistyla* Davies has been deposited in the Gray Herbarium.

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